**3GPP TSG-CT WG1 Meeting #136-eC1-22XXXX**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **23.122** | **CR** | **0942** | **rev** | **1** | **Current version:** | **17.6.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:***  | At switch on and no RPLMN in manual mode when UE support CAG |
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| ***Source to WG:*** | MediaTek Inc. |
| ***Source to TSG:*** | C1 |
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| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2022-05-13 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | As discussed in C1-223772, According to 4.4.3.1, when MS is in **manual mode**, the MS **keeps in manual mode**, with an *EXCEPTION*:…***At switch on****, … the MS selects the* ***registered*** *PLMN …If there is no registered PLMN , … the MS follows one of the following two procedures depending on its* ***PLMN selection operating mode***(i.e., AUTO or MANUAL) *….the MS shall use the PLMN selection mode that* ***was used before switching off*** *.*…*EXCEPTION: At* ***switch on****, if the MS is* ***in manual mode*** *and* ***neither registered PLMN*** *nor PLMN that is equivalent to it is available but EHPLMN is available, then instead of performing the manual network selection mode procedure of clause 4.4.3.1.2 the MS may select and attempt registration on the highest priority EHPLMN. If the EHPLMN list is not available or is empty and the HPLMN is available, then the MS may* ***select and attempt registration*** *on the* ***HPLMN****. The MS shall* ***remain in manual mode****.*The *EXCEPTION* can be regarded as **Autoly change PLMN in Manual mode**. It is okay to do it but we still need to **follow CAG restriction** before doing this. **A scenario that per Manual mode operation and Auto mode operation the HPLMN is not allowed:****Scenario A:*** Available HPLMN cells:
	+ HPLMN ***CAG 2*** cell,
* CAG Information List (or no CAG Information List)
	+ HPLMN entry (or no entry for HPLMN):
		- Allowed CAG list: ***CAG 1*** (or empty list)

In **Manual mode, per 4.4.3.1.2**: MS not presents to user HPLMNIn **Auto mode, per 4.4.3.1.1**: MS not considers HPLMNIn **Autoly change PLMN in Manual mode (i.e., the** *EXCEPTION* **above), in our view**: MS not select on the HPLMN.**Two scenarios that per Manual mode the HPLMN is allowed but per Auto mode operation the HPLMN is not allowed:****Scenario B.1:*** Available HPLMN cells:
	+ HPLMN ***non***-CAG cell
* CAG Information List
	+ HPLMN entry
		- Allowed CAG list: ***CAG 1*** (or empty list)
		- "indication that the MS is only allowed to access 5GS via CAG cells"

In **Manual mode, per 4.4.3.1.2**: MS presents to user HPLMN with an optional warning (*…MS may indicate to the user that the MS is only allowed to access the PLMN via CAG cells…*)In **Auto mode, per 4.4.3.1.1**: MS not considers HPLMNIn **Autoly change PLMN in Manual mode (i.e., the** *EXCEPTION* **above), in our view**: MS may select on the HPLMN, NAS 🡪 AS information: “CAG Information List” + ***an indication to select a non-CAG cell*** (because *"if the NAS has provided the AS with an indication to select a non-CAG cell, the MS shall ignore the "indication that the MS is only allowed to access 5GS via CAG cells", if any, in the "CAG information list" for the selected PLMN"*)**Scenario B.2:*** Available HPLMN cells:
	+ HPLMN ***CAG 2*** cell, broadcast the ***"PLMN allows a user to manually select the CAG-ID“***
* “CAG Information List” (or no “CAG Information List” )
	+ HPLMN entry (or no entry for HPLMN):
		- “Allowed CAG list”: ***CAG 1*** (or empty list)

In **Manual mode, per 4.4.3.1.2**: MS presents to user HPLMN with an optional warning (*For each of the presented CAG-ID, the MS may indicate to the user whether the CAG-ID is present in the "Allowed CAG list" stored in the UE*)In **Auto mode, per 4.4.3.1.1**: MS not considers HPLMNIn **Autoly change PLMN in Manual mode (i.e., the** *EXCEPTION* **above), in our view**: MS may select on the HPLMN, NAS 🡪 AS information: “CAG Information List” + ***the selected CAG-ID "CAG 2“*** (the "CAG Information List" only contains CAG 1 so NAS need to additionally specify that the CAG 2 is selected otherwise the AS will not campon this CAG 2 cell) |
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| ***Summary of change:*** | For scenarios that HPLMN is not considered by the MS per 4.4.3.1.1 (auto mode) and not presented to user per 4.4.3.1.2 (manual mode), the MS not select HPLMN.For scenarios that HPLMN is presented to user per 4.4.3.1.2 (manual mode), the MS can select HPLMN.For scenarios that HPLMN is presented to user per 4.4.3.1.2 (manual mode) but not considered by the MS per 4.4.3.1.1 (auto mode), the MS can select HPLMN but need to provide AS additional indicaitons:* For non-CAG cell, the NAS need to additionally provide ***an indication to select a non-CAG cell*** to AS; or
* For CAG cell, the NAS need to additionally provide ***the selected CAG-ID*** to AS.
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| ***Consequences if not approved:*** | The MS " **Autoly change PLMN in Manual mode (i.e., the** *EXCEPTION* **above)**" inappropriately during “**Manual** selection mode” when **user** is not involved. |
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| ***Clauses affected:*** | 4.4.3.1 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* First Change \* \* \* \*

#### 4.4.3.1 At switch‑on or recovery from lack of coverage

At switch on, following recovery from lack of coverage, or when the MS stops operating in the SNPN access mode, the MS selects the registered PLMN or equivalent PLMN (if it is available) using all access technologies that the MS is capable of and if necessary (in the case of recovery from lack of coverage, see clause 4.5.2) attempts to perform a Location Registration.

NOTE 1: The MS in automatic network selection mode can end the PLMN search procedure once the registered PLMN or equivalent PLMN is found on an access technology.

NOTE 2: An MS in automatic network selection mode can use location information to determine which PLMNs can be available in its present location.

EXCEPTION: As an alternative option to this, if the MS is in automatic network selection mode and it finds coverage of an EHPLMN, the MS may register to that EHPLMN and not return to the registered PLMN or equivalent PLMN. If the EHPLMN list is not present or is empty, and the HPLMN is available, the MS may register on the HPLMN and not return to the registered PLMN or equivalent PLMN. The operator shall be able to control by SIM configuration whether an MS that supports this option is permitted to perform this alternative behaviour.

EXCEPTION: As an alternative option to this, if the MS is in automatic network selection mode, the MS has a list of "PLMNs where registration was aborted due to SOR" and the registered PLMN is part of the list of "PLMNs where registration was aborted due to SOR", the MS may choose not to return to the registered PLMN or equivalent PLMN and proceed as defined in clause 4.4.3.1.1 with the exception that in iii), the MS considers PLMNs which are in the list of "PLMNs where registration was aborted due to SOR" as lowest priority.

EXCEPTION: In A/Gb mode an MS with voice capability, shall not search for CPBCCH carriers. In A/Gb mode an MS not supporting packet services shall not search for CPBCCH carriers.

If successful registration is achieved, the MS indicates the selected PLMN.

If there is no registered PLMN, or if registration is not possible due to the PLMN being unavailable or registration failure, the MS follows one of the following two procedures depending on its PLMN selection operating mode. At switch on, if the MS provides the optional feature of user preferred PLMN selection operating mode at switch on then this operating mode shall be used. Otherwise, the MS shall use the PLMN selection mode that was used before switching off.

EXCEPTION: At switch on, if the MS is in manual mode, neither registered PLMN nor PLMN that is equivalent to it is available but EHPLMN is available and if the MS supports CAG per clause 4.4.3.1.2 the EHPLMN is presented to the user, then instead of performing the manual network selection mode procedure of clause 4.4.3.1.2 the MS may select and attempt registration on the highest priority EHPLMN. If the EHPLMN list is not available or is empty, the HPLMN is available and if the MS supports CAG per clause 4.4.3.1.2 the HPLMN is presented to the user, then the MS may select and attempt registration on the HPLMN. If the MS supports CAG, the (highest priority E)HPLMN is selected and the conditions in clause 4.4.3.1.1 bullet m) are not met, the NAS provides the AS with a CAG-ID if there is a CAG cell broadcasting the CAG ID for the selected PLMN and also broadcasting that the PLMN allows a user to manually select the CAG-ID; or the NAS provides the AS with an indication to select a non-CAG cell if there is a non-CAG cell for the selected PLMN and there exists an entry for the selected PLMN in the "CAG information list" includes an "indication that the MS is only allowed to access 5GS via CAG cells". The MS shall remain in manual mode.

NOTE 3: If successful registration is achieved, then the current serving PLMN becomes the registered PLMN and the MS does not store the previous registered PLMN for later use.

EXCEPTION: If registration is not possible on recovery from lack of coverage due to the registered PLMN being unavailable, an MS attached to GPRS services, attached via E-UTRAN or registered via the NG-RAN may, optionally, continue looking for the registered PLMN for an implementation dependent time.

NOTE 4: An MS attached to GPRS services, attached via E-UTRAN or registered via the NG-RAN should use the above exception only if one or more PDP contexts, PDN connections or PDU sessions are currently active.

EXCEPTION: At switch on, if the RPLMN is a PLMN with which the MS was registered for disaster roaming and the MS is registered via non-3GPP access connected to 5GCN or an NG-RAN cell of the RPLMN broadcasts neither the disaster related indication nor a "list of one or more PLMN(s) with disaster condition for which disaster roaming is offered by the available PLMN" including the determined PLMN with Disaster Condition or an allowable PLMN is available then the MS will ignore RPLMN and its equivalent PLMN.

\* \* \* End of Changes \* \* \* \*